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Selected US specifications from IPC sub-class

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(54) Vehicle loading and unloading

(57) A structure 12 to facilitate loading a vehicle includes two parallel fixed tracks 16, and a parallel movable track 28, hung respectively from each of the fixed tracks 16. A beam 34 extends between the movable tracks 28. A winch is mounted on the beam and is movable along it. By moving the winch along the beam, the beam along the tracks 28, and the tracks along the tracks 16, the winch can be located above any position on the vehicle and above a range of positions outboard of the vehicle. The tracks and beam are all formed of the same extruded material and the tracks 28 and the beam are supported by runners 26 and 30 with further runners for supporting the winch from the beam. The tracks 16 are supported by pillars 18 and the tracks 28 are cantilevered from the tracks 16 when the winch is outboard of the vehicle.

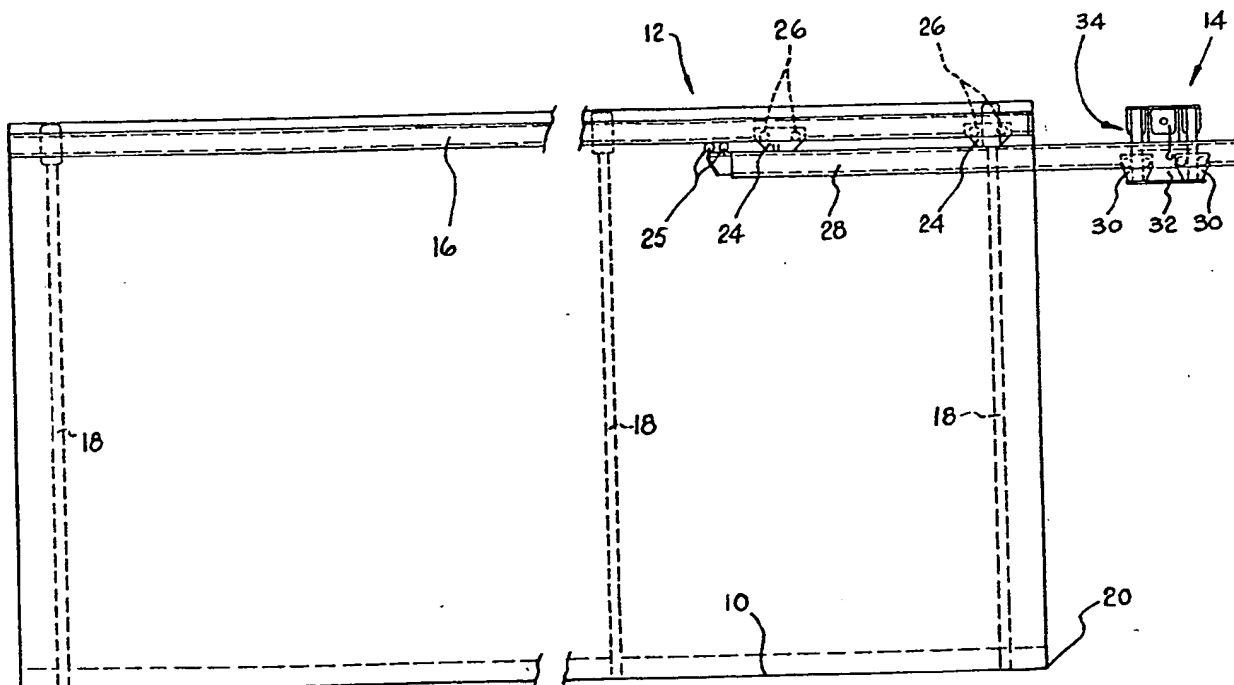


FIG. 1.



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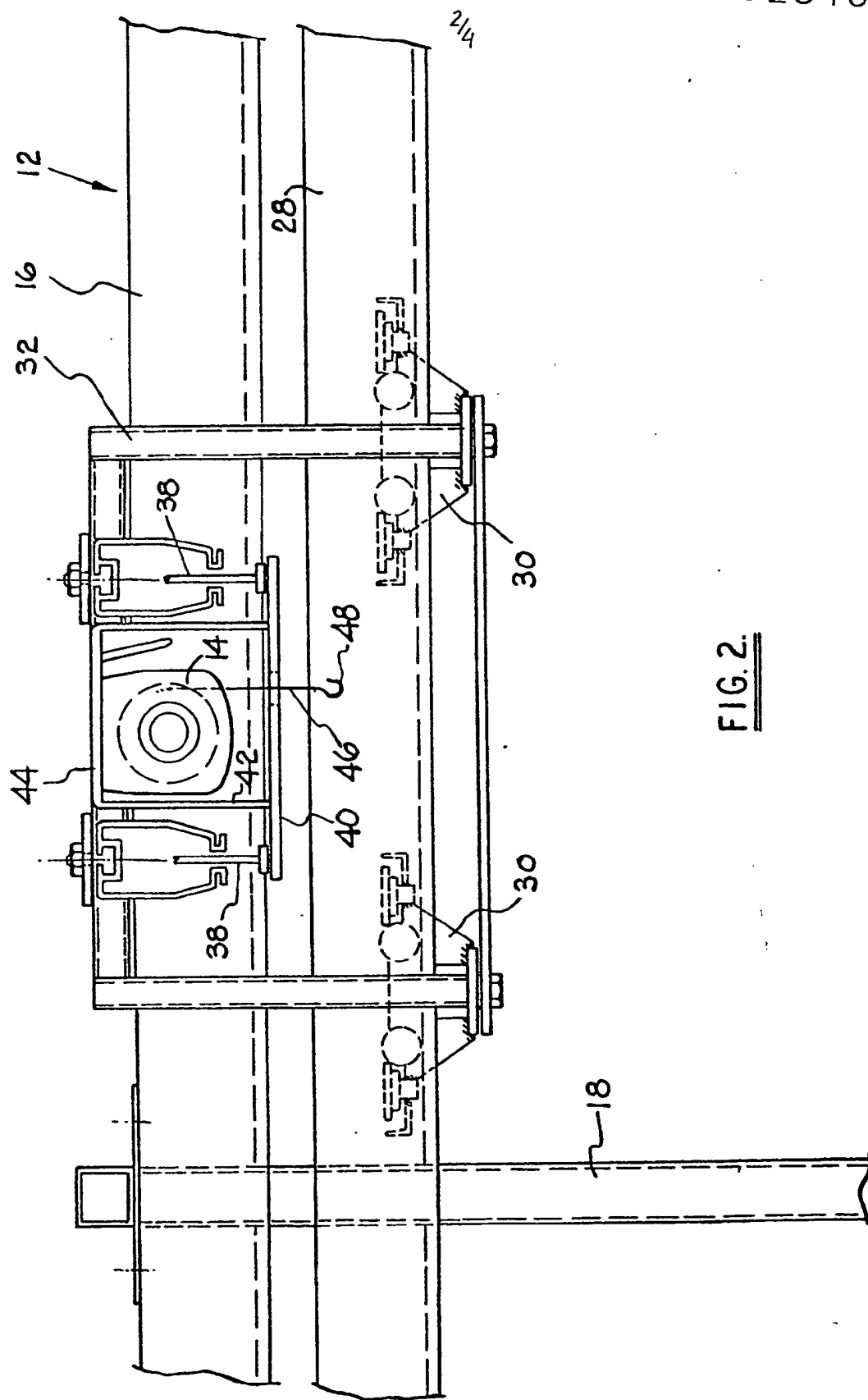
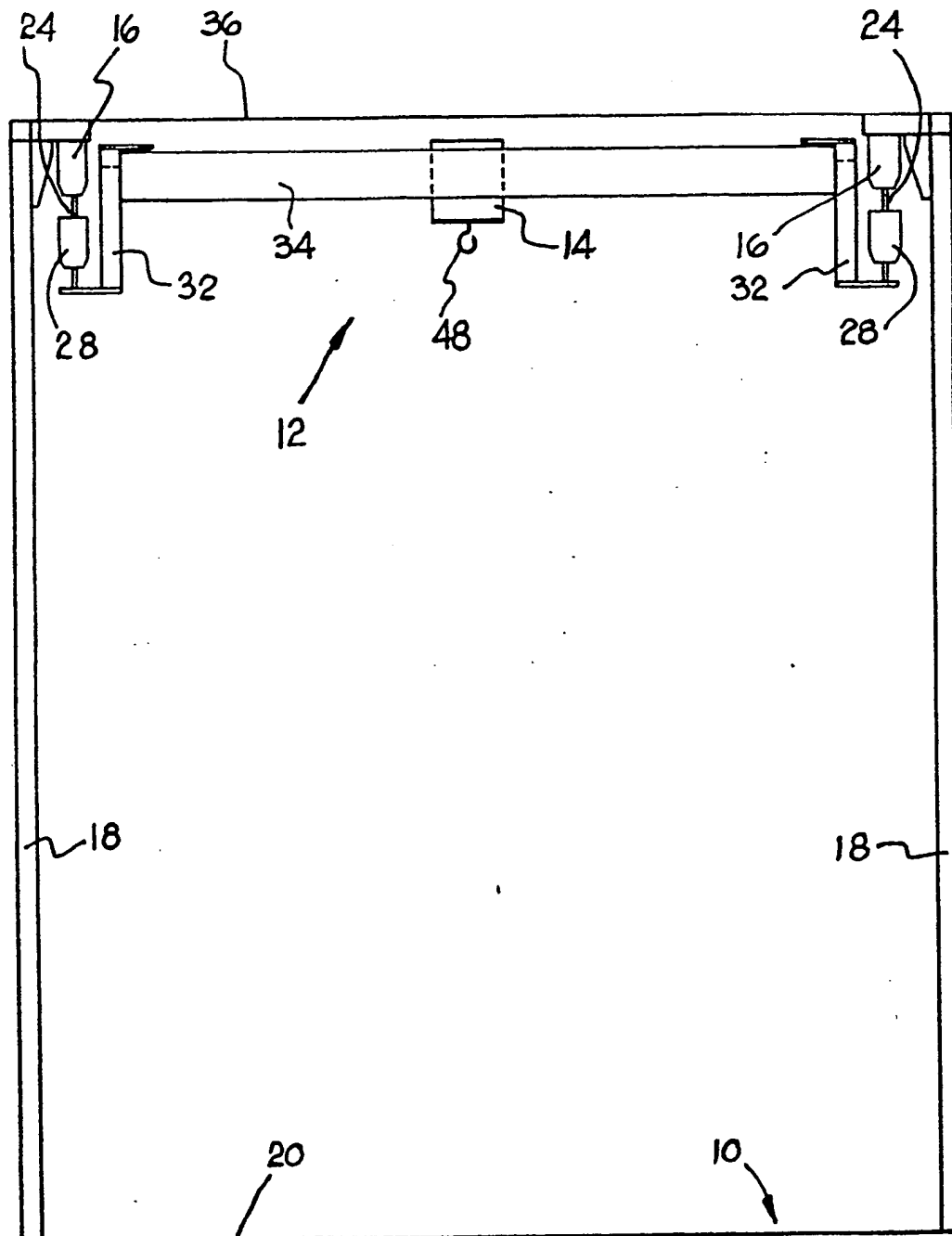
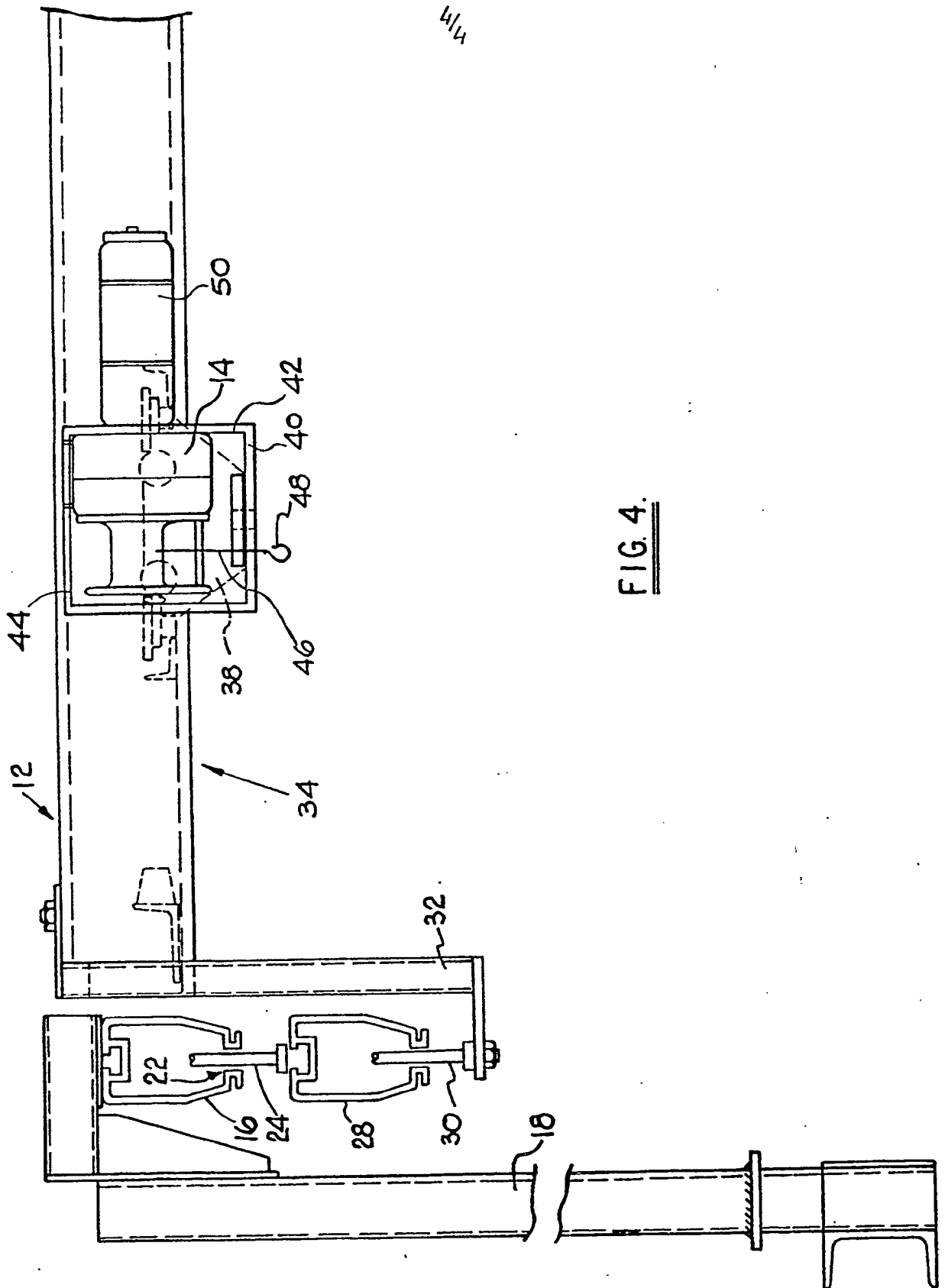


FIG. 2.

$\frac{3}{4}$ FIG. 3.



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Vehicle Loading and Unloading

The present invention relates ~~to~~ loading and unloading vehicles.

The present invention arises from an appreciation of problems encountered when loading and unloading vehicles such as lorries, vans and the like.

Load-carrying vehicles normally have a large load-carrying bed which may be uncovered, but is often covered by permanent walls and a permanent roof or by a permanent roof and removable sides. The vehicle is loaded by lifting goods onto the bed at some point on the periphery of the bed. The goods are then moved across or along the bed, if necessary. Almost all of the goods carried by the vehicle will need to be moved across or along the bed in this manner in order to make full use of the capacity of the vehicle, and it has been observed that this movement is often by man-handling, although personnel may be assisted by trolleys and the like. This can be time-consuming and dangerous.

A prior proposal for improving the safety and speed of loading a vehicle proposes the installation of a crane at the periphery of the bed, the crane having a jib which

is rotatable on a vertical post and which can reach out of the vehicle to pick up goods which are then lifted onto the bed. It is a drawback of this proposal that some man-handling of goods is still required once they have been deposited on the bed. The crane post can interfere with this, and also reduces the pay load of the vehicle.

It is an object of the present invention to obviate or mitigate these or other disadvantages of the prior art.

According to the present invention there is provided a vehicle having a load-carrying bed, a supporting framework above the bed, and a lifting mechanism supported by the supporting framework, wherein the lifting mechanism is movable on the supporting framework between a position inboard of the vehicle and directly above the bed and a position outboard of the vehicle.

Preferably the supporting framework comprises an inboard base section and a member which may be cantilevered from the base section to project outboard, the lifting mechanism being supported by the projecting portion of the cantilevered member when outboard.

Preferably the framework comprises two parallel cantilever members each of which may be cantilevered from

the base section to project outboard, the lifting mechanism being mounted between the cantilever members.

Preferably the lifting mechanism may move along the or each cantilever member between the inboard and outboard positions. Preferably the or each cantilevered member is slidably mounted on the base section and may be slid inboard when the lifting mechanism is inboard. Preferably the lifting mechanism is mounted on a beam which extends between the cantilevered members, the beam being movable along the cantilevered members. Preferably the beam is movable along the cantilevered members over a region inboard of the vehicle and over a region outboard of the vehicle, whereby the lifting mechanism may be located over those regions.

Preferably the lifting mechanism is movable along the beam whereby to move transversely of or parallel to the cantilever members.

Preferably the base section comprises two parallel members from which respective cantilever members are supported, each cantilever member being parallel with the corresponding base section member. Preferably the cantilever members are hung from the base section members. Preferably the beam is hung from the cantilever members. Preferably the beam is hung by means of brackets which



project upwardly from beneath the cantilever members, the beam being attached to the upper portions of the brackets, whereby the beam is at least partially above the lowermost part of the cantilever members.

Preferably a roof extends over the bed, above and adjacent the base section, the brackets extending upwardly to locate the beam adjacent the roof.

Preferably the base section members and/or the cantilever members are elongate hollow members having an elongate slot in their lowermost surface and providing within the slot a track for a runner which may project downwardly through the slot and from which the cantilever member or bracket respectively may be hung. Preferably each runner comprises at least one wheel which is supported on an elongate surface which forms the track.

Preferably the base section is supported above the bed by pillars. The pillars may be attached at their lowermost ends to the chassis of the vehicle.

Preferably the lifting mechanism is a winch.

In a second aspect, the invention provides a vehicle having a load-carrying bed, a supporting framework above

the bed and a lifting mechanism supported by the supporting framework, wherein the lifting mechanism is movable on the supporting framework to a position above any point in at least a region of the bed.

Preferably the framework comprises two parallel members, the lifting mechanism being mounted between the parallel members. Preferably the lifting mechanism may move along the parallel members.

The lifting mechanism may be mounted on a beam which extends between the parallel members, the beam being movable along the parallel members. Preferably the beam is movable along the parallel members over a region inboard of the vehicle and over a region outboard of the vehicle, whereby the lifting mechanism may be located over those regions.

Preferably the lifting mechanism is movable along the beam, whereby to move transversely of or parallel to the parallel members.

Preferably the lifting mechanism is movable on the supporting framework between a position inboard of the vehicle and directly above the aforesaid region of the bed and a position outboard of the vehicle.

Preferably the framework comprises an inboard base section, the parallel members being cantilever members which may be cantilevered from the base section to project outboard of the vehicle, the lifting mechanism being supported by the projecting portion of the cantilevered members when outboard. Preferably the cantilevered members are slidably mounted on the base section and may be slid inboard when the lifting mechanism is inboard.

Preferably the base section comprises two parallel base section members from which respective cantilever members are supported, each cantilever member being parallel with the corresponding base section member.

Preferably the cantilever members are hung from the base section members. Preferably the beam is hung from the cantilever members. The beam may be hung by means of brackets which project upwardly from beneath the cantilever members, the beam being attached to the upper portions of the brackets, whereby the beam is at least partially above the lowermost portion of the cantilever members.

Preferably a roof extends over the bed, above and adjacent the base section, the brackets extending upwardly to locate the beam adjacent the roof.

Preferably the base section members and/or the cantilever members are elongate hollow members having an elongate slot on their lowermost surface and providing within the slot a track for a runner which may project downwardly through the slot and from which the cantilever member or bracket respectively may be hung. Preferably each runner comprises at least one wheel which is supported on an elongate surface which forms the track.

Preferably the base section is supported above the bed by pillars. The pillars may be attached at their lowermost ends to the chassis of the vehicle.

Preferably the lifting mechanism is a winch.

The present invention further provides a supporting framework for use in the construction of a vehicle according to either aspect of the invention. The supporting framework may incorporate any or all of the preferred features outlined above.

One embodiment of apparatus according to the present invention will now be described in more detail, by way of example only and with reference to the accompanying drawings in which :

Fig. 1 is a part-schematic side elevation of a bed and associated superstructure of a first embodiment of the invention;

Fig. 2 is a similar view in more detail and showing the lifting mechanism and cantilever members in their retracted position;

Fig. 3 is a schematic rear view of the apparatus of Fig. 1; and

Fig. 4 is a view similar to Fig. 3 and on an enlarged scale.

The drawings show the bed and associated superstructure of a vehicle having a load-carrying bed 10, a supporting framework (shown generally at 12) above the bed 10, and a lifting mechanism 14 in the form of a winch. The winch 14 is supported by the supporting framework 12 and is movable on the supporting framework as will be described, between a position inboard of the vehicle and directly above the bed 10, and a position (as shown) outboard of the vehicle.

In more detail, the supporting framework comprises two parallel fixed tracks 16 which are mounted on vertical pillars 18 to extend across the bed 10 from the edge 20 from which the vehicle will be loaded (normally the tailgate). The pillars 18 are connected at their lowermost

ends to the chassis of the vehicle (not shown) so that weight carried by the tracks 16 is transmitted directly to the chassis. The bed 10 may be walled in around the pillars 18 as desired, and a roof may be located above the tracks 16 if desired.

Each track 16 is an elongate hollow extrusion of an appropriate material, such as steel. An elongate slot 22 (Fig. 4) extends along the length of the lowermost surface of the track 16. Runners 24 extend downwardly through the slot 22 and are supported by means of four wheels 26 which run on the inside surface of the track 16 adjacent the slot 22. Additional wheels on the runners may be provided to run along external surfaces of the track 16 in order to prevent the runners 24 becoming misaligned and jamming. The runners 24 and similar runners to be described are shown schematically in some views, for simplicity.

Two runners 24 are provided on each track 16. A second, cantilevered track 28 is hung from the runners 24 of each track 16. The tracks 28 are made of the same profiled extrusion as the tracks 16 and are parallel to the tracks 16. The runners 24 are attached to the cantilever tracks 28 at positions chosen so that when the runners 24 are in one extreme position along the fixed tracks 16, a length of the cantilever track 28 projects

out from above the bed 10 to overlie a region outside (outboard of) the vehicle. Alternatively, the cantilever tracks 28 can be run in on the runners 24 to be completely inboard of the vehicle. Wheels 25 may be provided at the position shown, or elsewhere, to co-operate between the tracks 16,28 to prevent misalignment, and in particular to prevent excessive tilting of the tracks 28 when run out to their projecting position.

A further two runners 30, like the runners 24, run in the cantilever tracks 28. A bracket 32 is hung from each cantilever track 28 by means of the runners 30. Between the tracks 28, the brackets 32 turn upwardly and support a beam 34 which extends between the brackets 32 at approximately the same height as the fixed tracks 16. The brackets 32 are preferably designed to locate the beam 34 as near as possible to the roof 36 of the vehicle so that the payload beneath the beam is maximised.

The beam 34 comprises a further two lengths of the extrusion used for the tracks 16,32. These two lengths are braced together for strength as required, bearing in mind that they are supported only at their ends, by brackets 32.

A further runner 38 like the runners 24,30 is

provided in each track of the beam 34. The runners 38 support a base plate 40 which in turn supports side walls 42 and a roof 44. The side walls and roof form a housing within which the winch 14 is housed. The winch cable 46 extends down through an opening in the base plate 40 and terminates in a hook 48. An electric motor 50 is incorporated in the winch. The motor 50 is controlled by operator controls located at any convenient position. For instance, the controls may be on a control panel which is hung from one of the brackets 32 by an umbilical cable providing the necessary connections to the motor 50.

It will be appreciated, especially from Fig. 2, that the use of two tracks to form the beam 34 allows the winch 14 to be securely supported and also to be located at a high position within the vehicle adjacent the roof 36. This maximizes the height of the winch 14 above the bed 10, and the vehicle payload.

The structure described above can be used in a variety of configurations. In the configuration of Fig. 1, the tracks 16 and pillars 18 form an inboard base section, while the cantilever tracks 28 are cantilevered from the base section to project out of the vehicle. The beam 34 and winch 14 are supported on the projecting portion of the cantilever tracks 28 when outboard of the



vehicle. Thus, in the configuration shown in Fig. 1, the winch 14 can be used to pick up articles on the ground outside the vehicle, and can be located directly above those articles when picking them up.

Once an article has been picked up by the winch 14, the beam can be run along the cantilever tracks 28, which can in turn be run along the tracks 16, until the winch 14 is inboard of the vehicle. The articles carried by the winch 14 can then be lowered onto the bed 10.

In the structure described, the winch 14 can run along substantially the whole length of the beam 34. The beam 34 can run along substantially the whole length of the track 28. The track 28 can be located in a range of positions under the tracks 16 so that the beam can be positioned at any point along substantially the whole length of the tracks 16 or the projecting portion of the cantilever tracks 28 (when projecting). These features combine to allow the winch 14 to be positioned directly above substantially any point of the bed 10 and over any point of a region of the ground outboard of the vehicle.

The apparatus described is used to load the vehicle in the following manner. The vehicle is manoeuvred so that the tailgate 20 is near the articles to be loaded,

which are on the ground or in a loading bay. The cantilever tracks 28 are then extended (by hand) to project outboard of the vehicle, over the goods to be loaded. The beam 34 is run out along the cantilever tracks 28 and the winch 14 is run along the beam 34, until the winch 14 is directly above the first article to be loaded. The hook 48 is lowered to lift the article above the level of the bed 10. The winch 14 can then be moved to be directly over any point of the bed 10 on which it is desired to place the article being loaded. The winch 14 is moved to this position by a combination of movement along the beam 34, of the beam 34 along the tracks 28, and of the tracks 28 along the tracks 16, if necessary. The article being loaded can then be lowered onto the bed 10 and need not be moved thereafter.

The winch 14 is then moved back outboard of the vehicle to be directly over the next article to be loaded, which is handled in the same manner.

Articles on the bed 10 can be unloaded from the vehicle by reversing the above sequence of operation.

During loading or unloading, the weight of the articles is supported by the winch and its supporting structure so that man-handling of the weight is avoided.

Workmen only need to provide the horizontal forces necessary to move the runners 24, 30 and 38 in their respective tracks. The safety of the unloading and loading operations is therefore enhanced. The supporting structure transmits the load to the vehicle chassis through the pillars 18, so that side walls and a roof (if any) above the bed do not need to be specially strengthened. However, in some circumstances the walls and roof may be sufficiently strong to allow the supporting structure to be mounted thereon, without additional strengthening or pillars 18 being required.

Various modifications to the arrangement described above can be made. For instance, at the present time it is envisaged that the runners 24 can be made sufficiently free that workmen will be able to push articles horizontally without undue effort. In some circumstances, it may be desirable or necessary to motorize one or more of the runners 24. Other forms of track and runner could be used.

Whilst endeavouring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

CLAIMS :

1. A vehicle having a load-carrying bed, a supporting framework above the bed, and a lifting mechanism supported by the supporting framework, wherein the lifting mechanism is movable on the supporting framework between a position inboard of the vehicle and directly above the bed and a position outboard of the vehicle.
2. A vehicle according to claim 1, wherein the supporting framework comprises an inboard base section and a member which may be cantilevered from the base section to project outboard, the lifting mechanism being supported by the projecting portion of the cantilevered member when outboard.
3. A vehicle according to claim 2, wherein the framework comprises two parallel cantilever members each of which may be cantilevered from the base section to project outboard, the lifting mechanism being mounted between the cantilever members.
4. A vehicle according to claim 2 or 3, wherein the lifting mechanism may move along the or each cantilever member between the inboard and outboard positions.
5. A vehicle according to any of claims 2 to 4, wherein the or each cantilevered member is slidably mounted on the

base section and may be slid inboard when the lifting mechanism is inboard.

6. A vehicle according to any of claims 3 to 5, wherein the lifting mechanism is mounted on a beam which extends between the cantilevered members, the beam being movable along the cantilevered members.

7. A vehicle according to claim 6, wherein the beam is movable along the cantilevered members over a region inboard of the vehicle and over a region outboard of the vehicle, whereby the lifting mechanism may be located over those regions.

8. A vehicle according to claim 6 or 7, wherein the lifting mechanism is movable along the beam to move transversely of or parallel to the cantilever members.

9. A vehicle according to any of claims 2 to 8, wherein the base section comprises two parallel members from which respective cantilever members are supported, each cantilever member being parallel with the corresponding base section member.

10. A vehicle according to claim 9, wherein the cantilever members are hung from the base section members.

11. A vehicle according to claim 10, wherein the beam is

hung from the cantilever members.

12. A vehicle according to claim 11, wherein the beam is hung by means of brackets which project upwardly from beneath the cantilever members, the beam being attached to the upper portions of the brackets, whereby the beam is at least partially above the lowermost part of the cantilever members.

13. A vehicle according to claim 12, wherein a roof extends over the bed, above and adjacent the base section, the brackets extending upwardly to locate the beam adjacent the roof.

14. A vehicle according to any of claims 2 to 13, wherein the base section members and/or the cantilever members are elongate hollow members having an elongate slot in their lowermost surface and providing within the slot a track for a runner which may project downwardly through the slot and from which the cantilever member or bracket respectively may be hung.

15. A vehicle according to claim 14, wherein each runner comprises at least one wheel which is supported on an elongate surface which forms the track.

16. A vehicle according to any of claims 2 to 15, wherein the base section is supported above the bed by

pillars attached at their lowermost ends to the chassis of the vehicle.

17. A vehicle according to any preceding claim, wherein the lifting mechanism is a winch.

18. A vehicle having a load-carrying bed, a supporting framework above the bed and a lifting mechanism supported by the supporting framework, wherein the lifting mechanism is movable on the supporting framework to a position above any point in at least a region of the bed.

19. A vehicle according to claim 18, wherein the framework comprises two parallel members, the lifting mechanism being mounted between the parallel members.

20. A vehicle according to claim 19, wherein the lifting mechanism may move along the parallel members.

21. A vehicle according to claim 19 or 20, wherein the lifting mechanism is mounted on a beam which extends between the parallel members, the beam being movable along the parallel members.

22. A vehicle according to claim 21, wherein the beam is movable along the parallel members over a region inboard of the vehicle and over a region outboard of the vehicle, whereby the lifting mechanism may be located over those

regions.

23. A vehicle according to claim 21 or 22, wherein the lifting mechanism is movable along the beam, whereby to move transversely of or parallel to the parallel members.

24. A vehicle according to any of claims 18 to 23, wherein the lifting mechanism is movable on the supporting framework between a position inboard of the vehicle and directly above the aforesaid region of the bed and a position outboard of the vehicle.

25. A vehicle according to claim 24, wherein the framework comprises an inboard base section, the parallel members being cantilever members which may be cantilevered from the base section to project outboard of the vehicle, the lifting mechanism being supported by the projecting portion of the cantilevered members when outboard.

26. A vehicle according to claim 25, wherein the cantilevered members are slidably mounted on the base section and may be slid inboard when the lifting mechanism is inboard.

27. A vehicle according to claim 25 or 26, wherein the base section comprises two parallel base section members from which respective cantilever members are supported, each cantilever member being parallel with the



corresponding base section member.

28. A vehicle according to claim 25, 26 or 27 wherein the or each cantilever member is hung from the base section members.

29. A vehicle according to claim 28, wherein the lifting mechanism is mounted on a beam which is hung from the cantilever members.

30. A vehicle according to claim 29, in which the beam is hung by means of brackets which project upwardly from beneath the cantilever members, the beam being attached to the upper portions of the brackets, whereby the beam is at least partially above the lowermost portion of the cantilever members.

31. A vehicle according to claim 30, wherein a roof extends over the bed, above and adjacent the base section, the brackets extending upwardly to locate the beam adjacent the roof.

32. A vehicle according to any of claims 25 to 31, wherein the base section members and/or the cantilever members are elongate hollow members having an elongate slot on their lowermost surface and providing within the slot a track for a runner which may project downwardly through the slot and from which the cantilever member or

bracket respectively may be hung.

33. A vehicle according to claim 32, each runner comprises at least one wheel which is supported on an elongate surface which forms the track.

34. A vehicle according to any of claims 25 to 33, wherein the base section is supported above the bed by pillars attached at their lowermost ends to the chassis of the vehicle.

35. A vehicle according to any of claims 18 to 34, in which the lifting mechanism is a winch.

36. A supporting framework for use in the construction of a vehicle according to any preceding claim.

37. A vehicle substantially as described above with reference to the accompanying drawings.

38. Any novel subject matter or combination including novel subject matter herein disclosed, whether or not within the scope of or relating to the same invention as any of the preceding claims.